Comments Provided to DPS on

Proposed Amendments to IgCC Chapters 8—9

Chapter 8 – Indoor Environmental Quality and Comfort 801.1 Scope and intent. The provisions of this chapter are intended to provide an interior environment that is conducive to the health of building occupants.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: No Impact

2011 ASHRAE 189.1 CORRELATION: 8.1

801.2 Indoor air quality management plan required. An indoor air quality management plan shall be developed. Such plan shall address the methods and procedures to be used during design and construction to obtain compliance with Sections 802 through 805.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.3.1.2, 8.3.1.3

802.1 Scope. To facilitate the operation and maintenance of the completed building, the building and its systems shall comply with the requirements of Sections 802.2 and 802.3.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: None

802.2 Air-handling system access. The arrangement and location of air-handling system components including, but not limited to, ducts, air handler units, fans, coils and condensate pans, shall allow access for cleaning and repair of the air-handling surfaces of such components. Access ports shall be installed in the air-handling system to permit such cleaning and repairs. Piping, conduits, and other building components shall not be located so as to obstruct the required access ports.

802.3 Air-handling system filters. Filter racks shall be designed to prevent airflow from bypassing filters. Access doors and panels provided for filter replacement shall be fitted with flexible seals to provide an effective seal between the doors and panels and the mating filter rack surfaces. Special tools shall not be required for opening access doors and panels. Filter access panels and doors shall not be obstructed.

PROPOSED ACTION: Delete

RATIONALE / IMPACT: Covered by 2012 IMC with local amendments

2011 ASHRAE 189.1 CORRELATION: 8.3.1

803.1 Construction phase requirements. The ventilation of buildings during the construction phase shall be in accordance with Sections 803.1.1 through 803.1.3.

803.1.1 Duct openings. Duct and other related air distribution component openings shall be covered with tape, plastic, sheet metal or shall be closed by an approved method to reduce the amount of dust and debris that collects in the system from the time of rough-in installation and until startup of the heating and cooling equipment. Dust and debris shall be cleaned from duct openings prior to system flush out and building occupancy.

803.1.2 Indoor air quality during construction. Temporary ventilation during construction shall be provided in accordance with Sections 803.1.2.1 through 803.1.2.3.

803.1.2.1 Ventilation. Ventilation during construction shall be achieved through openings in the building envelope using one or more of the following methods: 1. Natural ventilation in accordance with the provisions of the International Building Code or the International Mechanical Code. 2. Fans that produce a minimum of three air changes per hour. 3. Exhaust in the work area at a rate of not less than 0.05 cfm/ft 2 (0.24 L/s/in 2 and not less than 10 percent greater than the supply air rate so as to maintain negative pressurization of the space.

803.1.2.2 Protection of HVAC system openings. HVAC supply and return duct and equipment openings shall be protected during dust-producing operations. 803.1.3 Construction phase ductless system or filter. Where spaces are conditioned during the construction phase, space conditioning systems shall be of the ductless variety, or filters for ducted systems shall be rated at MERV 8 or higher in accordance with ASHRAE 52.2, and system equipment shall be designed to be compatible. Duct system design shall account for pressure drop across the filter

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: None

803.2 Thermal environmental conditions for human occupancy. Buildings shall be designed in compliance with ASHRAE 55, Sections 6.1, "Design," and 6.2, "Documentation." Exception: Spaces with special requirements for processes, activities, or contents that require a thermal environment outside of that which humans find

thermally acceptable, such as food storage, natatoriums, shower rooms, saunas and drying rooms.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.3.2

803.3 Environmental tobacco smoke control. Smoking shall not be allowed inside of buildings. Any exterior designated smoking areas shall be located not less than 25 ft (7.5 m) away from building entrances, outdoor air intakes, and operable windows.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.3.1.4

803.4 Isolation of pollutant sources. The isolation of pollutant sources related to print, copy and janitorial rooms, garages and hangars shall be in accordance with Section 803.4.1.

803.4.1 Printer, copier and janitorial rooms. Enclosed rooms or spaces that are over 100 square feet (9.3 m 2 in area and that are used primarily as a print or copy facility containing five or more printers, copy machines, scanners, facsimile machines or similar machines in any combination, and rooms used primarily as janitorial rooms or closets where the use or storage of chemicals occurs, shall comply with all of the following: 1. The enclosing walls shall extend from the floor surface to the underside of the floor, roof deck or solid ceiling above and shall be constructed to resist the passage of airborne chemical pollutants and shall be constructed and sealed as required for 1-hour fire-resistance-rated construction assemblies. Alternatively, for janitorial rooms and closets, all chemicals shall be stored in approved chemical safety storage cabinets. 2. Doors in the enclosing walls shall be automatic or self-closing. 3. An HVAC system shall be provided that: provides separate exhaust airflow to the outdoors at a rate of not less than 0.50 cfm per square foot (2.4 L/s/m 2 that maintains a negative pressure of not less than 7 Pa within the room; and that prohibits the recirculation of air from the room to other portions of the building.

PROPOSED ACTION: Delete

RATIONALE / IMPACT: Does not account for advances in office equipment technology or potential change of use for spaces based on changing technologies; and requirement

for fire rated partitions does not accurately respond to level of hazard given standard office equipment and increasing use of green cleaning supplies.

2011 ASHRAE 189.1 CORRELATION: 8.3.1

803.5 Filters. Filters for air-conditioning systems that serve occupied spaces shall be rated at MERV 11 or higher, in accordance with ASHRAE Standard 52.2, and system equipment shall be designed to be compatible. The air-handling system design shall account for pressure drop across the filter. The pressure drop across clean MERV 11 filters shall be not greater than 0.45 in. w.c. at 500 FPM (412 Pa at 2.54 m/s) filter face velocity. Filter performance shall be shown on the filter manufacturer's data sheet.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.3.1.3

804.1 Fireplaces and appliances. Where located within buildings, fireplaces, solid fuel-burning appliances, vented decorative gas appliances, vented gas fireplace heaters and decorative gas appliances for installation in fireplaces shall comply with Sections 804.1.1 through 804.1.3. Unvented room heaters and unvented decorative appliances, including alcohol burning, shall be prohibited.

804.1.1 Venting and combustion air. Fireplaces and fuel-burning appliances shall be vented to the outdoors and shall be provided with combustion air provided from the outdoors in accordance with the International Mechanical Code and the International Fuel Gas Code. Solid- fuel-burning fireplaces shall be provided with a means to tightly close off the chimney flue and combustion air openings when the fireplace is not in use.

804.1.2 Wood-fired appliances. Wood stoves and wood-burning fireplace inserts shall be listed and, additionally, shall be labeled in accordance with the requirements of the EPA Standards of Performance for New Residential Wood Heaters, 40 CFR Part 60, subpart AAA. 804.1.3 Biomass appliances. Biomass fireplaces, stoves and inserts shall be listed and labeled in accordance with ASTM E 1509 or UL 1482. Biomass furnaces shall be listed and labeled in accordance with CSA B366.1 or UL 391. Biomass boilers shall be listed and labeled in accordance with CSA B366.1 or UL 2523.

PROPOSED ACTION: Delete

RATIONALE / IMPACT: Covered by 2012 IMC with County amendments

2011 ASHRAE 189.1 CORRELATION: None

804.2 Post-construction, pre-occupancy baseline IAQ testing. Where this section is indicated to be applicable in Table 302.1, and after all interior finishes are installed, the building shall be tested for indoor air quality and the testing results shall indicate that the levels of VOCs meet the levels detailed in Table 804.2 using testing protocols in accordance with ASTM D 6196, ASTM D 5466, ASTM D 5197, ASTM D 6345, and ISO 7708. Test samples shall be taken in not less than one location in each 25,000 square feet (1860 m 2 of floor area or in each contiguous floor area. Exceptions: 1. Group F, H, S and U occupancies shall not be required to comply with this section. 2. A building shall not be required to be tested where a similarly designed and constructed building as determined by the code official, for the same owner or tenant, has been tested for indoor air quality and the testing results indicate that the level of VOCs meet the levels detailed in Table 804.2. 3. Where the building indoor environment does not meet the concentration limits in Table 804.2 and the tenant does not address the air quality issue by mitigation and retesting, the building shall be flushed-out by supplying continuous ventilation with all air-handling units at their maximum outdoor air rate for at least 14 days while maintaining an internal temperature of at least 60°F (15.6°C), and relative humidity not higher than 60 percent. Occupancy shall be permitted to start 7 days after start of the flush-out, provided that the flush-out continues for the full 14 days.

PROPOSED ACTION: Move to Appendix A – Adopt as written (804.2 is a Jurisdictional Elective)

RATIONALE / IMPACT: Good practice. May be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: None

805.1 Scope. The use of the following materials shall be prohibited: 1. Asbestos-containing materials. 2. Urea-formaldehyde foam insulation.

PROPOSED ACTION: Delete

RATIONALE / IMPACT: Regulated by EPA

2011 ASHRAE 189.1 CORRELATION: None 806.1 Emissions from composite wood products. Composite wood products used interior to the approved weather covering of the building shall comply with the emission limits or be manufactured in accordance with the standards cited in Table 806.1. Compliance with emission limits shall be demonstrated following the requirements of Section 93120 of Title 17, California Code of Regulations, Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products. Exceptions: 1. Composite wood products that are made using adhesives that do not contain urea-formaldehyde (UF) resins. 2. Composite wood products that are sealed with an impermeable material on all sides and edges. 3. Composite wood products that are used to make elements considered to be furniture, fixtures and equipment (FF&E) that are not permanently installed.

PROPOSED ACTION: Delete

RATIONALE / IMPACT: Regulated by EPA

2011 ASHRAE 189.1 CORRELATION: 8.4.2.4

806.2 Adhesives and sealants. A minimum of 85 percent by weight or volume, of specific categories of site-applied adhesives and sealants used on the interior side of the building envelope shall comply with the VOC content limits in Table 806.2(1) or alternative VOC emission limits in Table 806.2(2). The VOC content shall be determined in accordance with the appropriate standard being either U.S. EPA Method 24 or SCAQMD Method 304, 316A or 316B. The exempt compound content shall be determined by either SCAQMD Methods 302 and 303 or ASTM D 3960. Table 806.2(1) adhesives and sealants regulatory category and VOC content compliance determination shall conform to the SCAQMD Rule 1168 Adhesive and Sealant Applications as amended on 1/7/05. The provisions of this section shall not apply to adhesives and sealants subject to state or federal consumer product VOC regulations. HVAC duct sealants shall be classified as "Other" category within the SCAQMD Rule 1168 sealants table. Exception: HVAC air duct sealants are not required to meet the emissions or the VOC content requirements when the air temperature in which they are applied is less than 40°F (4.5°C). Table 806.2(2) adhesive alternative emissions standards compliance shall be determined utilizing test methodology incorporated by reference in the CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The alternative emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice: allows latitude for areas with special requirements

2011 ASHRAE 189.1 CORRELATION: 8.4.2.1, 8.4.2.1.1, 8.4.2.1.2

806.3 Architectural paints and coatings. A minimum of 85 percent by weight or volume, of site-applied interior architectural coatings shall comply with VOC content limits in Table 806.3(1) or the alternate emissions limits in Table 806.3(2). The exempt compound content shall be determined by ASTM D 3960. Table 806.3(2) architectural coating alternate emissions standards compliance shall be determined utilizing test methodology incorporated by reference in the CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The alternative emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025

Accreditation. TABLE 806.3(1)—continued c, d, e VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS b. Limit is expressed as VOC actual. c. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table. d. Values in this table are derived from those specified by the California Air Resources Board Suggested Control Measure for Architectural Coatings, dated February 1, 2008. e. Table 806.3(1) architectural coating regulatory category and VOC content compliance determination shall conform to the California Air Resources Board Suggested Control Measure for Architectural Coatings, dated February 1, 2008.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice: allows latitude for areas with special requirements

2011 ASHRAE 189.1 CORRELATION: 8.4.2.1, 8.4.2.1.1, 8.4.2.1.2

806.4 Flooring. A minimum of 85 percent of the total area of flooring installed within the interior of the building shall comply with the requirements of Table 806.4(2). Where flooring with more than one distinct product layer is installed, the emissions from each layer shall comply with these requirements. The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation. Where post-manufacture coatings or surface applications have not been applied, the flooring listed in Table 806.4(1) shall be deemed to comply with the requirements of Table 806.4(2).

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice: allows latitude for areas with special requirements

2011 ASHRAE 189.1 CORRELATION: 8.4.2.3

806.5 Acoustical ceiling tiles and wall systems. A minimum of 85 percent of acoustical ceiling tiles and wall systems, by square feet, shall comply with the requirements of Table 806.5(2). Where ceiling and wall systems with more than one distinct product layer are installed, the emissions from each layer shall comply with these requirements. The test methodology used to determine compliance shall be from CDPH/ EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation. Where post-manufacture coatings or surface

applications have not been applied, the ceiling or wall systems listed in Table 806.5(1) shall be deemed to comply with the requirements of Table 806.5(2).

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.4.2.6

806.6 Insulation. A minimum of 85 percent of insulation shall comply with the requirements of Table 806.6(1) or Table 808.6(2). The test methodology used to determine compliance shall be from CDPH/EHLB/Standard Method V.1.1, Standard Method for Testing VOC Emissions From Indoor Sources, dated February 2010. The emissions testing shall be performed by a laboratory that has the CDPH/EHLB/ Standard Method V.1.1 test methodology in the scope of its ISO 17025 Accreditation.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

2011 ASHRAE 189.1 CORRELATION: 8.4.2.6 SECTION

807 - ACOUSTICS 807.1 Sound transmission and sound levels. Where required by Table 302.1, buildings and tenant spaces shall comply with the minimum sound transmission class and maximum sound level requirements of Sections 807.2 through 807.5.2. Exception: The following buildings and spaces need not comply with this section: 1. Building or structures that have the interior environment open to the exterior environment. 2. Parking structures. 3. Concession stands and toilet facilities in Group A-4 and A-5 occupancies.

807.2 Sound transmission. Sound transmission classes established by laboratory measurements shall be determined in accordance with ASTM E 413 based on measurements in accordance with ASTM E 90. Sound transmission classes for concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined in accordance with ASTM E 413 based on measurements in accordance with ASTM E 90. Field measurements of completed construction, if conducted, shall be in accordance with ASTM E 336 where conditions regarding room size and absorption required in ASTM E 336 are met.

807.2.1 Interior sound transmission. Wall and floor-ceiling assemblies that separate Group A and F occupancies from one another or from Group B, I, M or R occupancies shall have a sound transmission class (STC) of not less than 60 or an apparent sound transmission class (ASTC) of not less than 55 if the completed construction is field tested. Wall and floor-ceiling assemblies that separate Group B, I, M or R occupancies

from one another shall have a sound transmission class (STC) of not less than 50 or an apparent sound transmission class (ASTC) of not less than 45 if the completed construction is field tested. Wall and floor-ceiling assemblies that separate Group R condominium occupancies from one another or from other Group B, I, M or R occupancies shall have a sound transmission class (STC) of not less than 55 or an apparent sound transmission class (ASTC) of not less than 50 if the completed construction is field tested. Exception: This section shall not apply to wall and floor-ceiling assemblies enclosing: 1. Public entrances to tenants of covered and open mall buildings. 2. Concession stands and lavatories in Group A-4 and A-5 occupancies. 3. Spaces and occupancies that are accessory to the main occupancy.

807.2.2 Mechanical and emergency generator equipment and systems. Wall and floor-ceiling assemblies that separate a mechanical equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 50 or an apparent sound transmission class (ASTC) of not less than 45 if the completed construction is field tested, Wall and floor-ceiling assemblies that separate a generator equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 60 or an apparent sound transmission class (ASTC) of not less than 55 if the completed construction is field tested.

807.3 Sound levels. The design and construction of mechanical and electrical generator systems and of walls and floor- ceilings separating such equipment from the outdoors or other building space shall achieve sound levels not greater than specified in Sections 807.3.1 and 807.3.2 during the normal operation of mechanical equipment and generators. Electrical generators used only for emergencies are exempt from the limits on sound levels within the building and need only meet daytime limits for sound-reaching boundaries. Where necessary, walls and floor-ceiling assemblies with sound transmission class (STC) ratings greater than specified in Section 807.2.2 shall be used to meet this requirement 807.3.1 Sound of mechanical and electrical generator equipment outside of buildings. Where mechanical equipment or electrical generators are located outside of the building envelope or their sound is exposed to the exterior environment, the sound reaching adjacent properties shall comply with all applicable ordinances and zoning performance standards. In the absence of an ordinance or zoning performance standard specifying sound limits at the boundary, or a law specifying different limits if limits are imposed, an adjacent property at the boundary shall not be subjected to a sound level greater than indicated in Table 807.3.1 because of the sound of the equipment. Where a generator is used only for providing emergency power and all periodic operational testing is done during the daytime period of Table 807.3.1, the sound of a generator during the night-time hours shall meet the daytime limits.

807.3.2 Sound of HVAC and mechanical systems within buildings. Sound levels within rooms generated by HVAC and mechanical systems within the building, including electrical generators used regularly but excluding emergency generators, for all modes

of operation shall not exceed the limits shown in Table 807.3.2. 807.4 Structure-borne sounds. Floor and ceiling assemblies between dwelling rooms or dwelling units and between dwelling rooms or dwelling units and public or service areas within the structure in occupancies classified as Group A1, A2, A3, B, E, I, M or R shall have an impact insulation classification (IIC) rating of not less than 50 where laboratory-tested and 45 where field-tested when tested in accordance with ASTM E 492. New laboratory tests for impact insulation class (IIC) of an assembly are not required where the IIC has been established by prior tests 807.5 Special inspections for sound levels. An approved agency, funded by the building owner, shall furnish report(s) of test findings indicating that the sound level results are in compliance with this section, applicable laws and ordinances, and the construction documents. Discrepancies shall be brought to the attention of the design professional and code official prior to the completion of that work. A final testing report documenting required testing and corrections of any discrepancies noted in prior tests shall be submitted at a point in time agreed upon by the building owner, or building owner's agent, design professional, and the code official for purposes of demonstrating compliance 807.5.1 Testing for mechanical and electrical generator equipment outside of buildings. Special inspections shall be conducted in accordance with Section 903.1 to demonstrate compliance with the requirements of Section 807.3.1. Testing shall be conducted following the complete installation of the equipment or generators, the installation of sound reduction barriers, and balancing and operation of the equipment or generators. Testing shall be at locations representing the four cardinal directions from the face of the project building. Such testing shall demonstrate that the equipment is capable of compliance with the night-time limits under normal night-time operating conditions, and if higher sound levels are possible during the daytime, compliance with the daytime limits shall also be demonstrated. 807.5.2 Testing for building system background noise. Special inspections shall be conducted in accordance with Section 903.1 to demonstrate compliance with the requirements of Section 807.3.2. Testing shall be executed within not less than 50 percent of the total number of rooms contained in a building or structure of the types listed in Table 807.3.2 for the given occupancy in accordance with Table 903.1. Testing shall occur following the complete installation of the equipment and systems, the installation of any sound reduction barriers, and balancing and operation of the equipment and systems. 807.5.3 Separating assemblies. Wall and floor-ceiling assemblies that separate a mechanical or emergency generator equipment room or space from the remainder of the building shall have a sound transmission class (STC) of not less than 60 determined in accordance with ASTM E 90 and ASTM E 413, or for concrete masonry and clay masonry assemblies as calculated in accordance with TMS 0302 or as determined in accordance with ASTM E 90 and ASTM E 413.

807.5.4 HVAC background sound. HVAC system caused background sound levels for all modes of operation within rooms shall be in accordance with the lower and upper noise criteria (NC) limits as shown in Table 807.3.2. Special inspections shall be required and conducted in accordance with Section 903.1 in order to demonstrate compliance. 807.6 Special inspections for sound transmission. An approved agency,

employed by the building owner, shall furnish report(s) of test findings indicating that the results are in compliance with this section and the construction documents. Discrepancies shall be brought to the attention of the design professional and code official prior to the completion of that work. A final testing report documenting required testing and corrections of any discrepancies noted in prior tests shall be submitted at a point in time agreed upon by the building owner, or building owner's agent, design professional, and the code official for purposes of demonstrating compliance. Exception: Test reports are not required for approved assemblies with an established sound transmission class (STC) rating.

807.6.1 Testing for mechanical and emergency generator equipment outside of buildings. In accordance with Section 807.3.1, all mechanical and emergency generator equipment shall be field tested in accordance with Table 903.1. Testing shall be conducted following the complete installation of the equipment or generators, the installation of sound reduction barriers, and balancing and operation of the equipment or generators. Testing shall be at locations representing the four cardinal directions from the face of the project building. Such testing shall occur on a Tuesday, Wednesday or Thursday at both the day and night times within the periods shown in Table 807.3.1.

807.6.2 Testing for building system background noise. Testing shall be executed in accordance with Section 807.3.1 within not less than 50 percent of the total number of rooms contained in a building or structure, exclusive of closets and storage rooms less than 50 square feet (4.65 m 2 in area, and exclusive of toilet facilities in accordance with Table 903.1. Testing shall occur following the complete installation of the equipment and systems, the installation of any sound reduction barriers, and balancing and operation of the equipment and systems.

PROPOSED ACTION: Move to Appendix A - Adopt as written (807.1 is a Jurisdictional Elective which includes 807.2 through 807.5.2)

RATIONALE / IMPACT: Good practice however impractical due to administrative issues to handle requirements for post construction testing and costs associated with potential corrections; difficult to enforce; and unaddressed acoustical issues are not an overriding issue in typical projects.

2011 ASHRAE 189.1 CORRELATION: 8.3.2; 8.3.3

SECTION 808 - DAYLIGHTING 808.1 General. Fenestration shall be provided in building roofs and walls in accordance with Sections 808.2 and 808.3. Interior spaces shall be planned to benefit from exposure to the natural light offered by the fenestration in accordance with this section. 808.1.1 Fenestration obstructions. Advertisements or displays affixed or applied to a fenestration, or supported by the building shall not reduce daylighting below the levels prescribed herein. Exception: The ground floor and the story immediately above the ground floor.

PROPOSED ACTION: Move to Appendix A – Adopt as written

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.2 Applicability. Daylighting of building spaces in accordance with Section 808.3 shall be required for the following occupancies: 1. A Group A-3 occupancy where the specific use of the room or space is for reading areas in libraries, waiting areas in transportation terminals, exhibition halls, gymnasiums, and indoor athletic areas. 2. A Group B occupancy where the specific use of the room or space is for educational facilities for students above the 12th grade, laboratories for testing and research, post offices, print shops, offices, and training and skill development not within a school or academic program. 3. Group E, F and S occupancies. 4. Those portions of Group M occupancies located directly underneath a roof, where the net floor area of the entire occupancy is 10,000 square feet (929 m 2 or greater. Exception: Daylighting is not required in the following rooms and spaces: 1. Building spaces where darkness is required for the primary use of the space, including, but not limited to, light-sensitive material handling and darkrooms. 2. Building spaces that are required to be cooled below 50°F (10°C). 3. Unconditioned buildings that are equipped with exterior doors that, when opened, provide equivalent daylighting. 4. Alteration, repair, movement, or change of occupancy of existing buildings.

PROPOSED ACTION: Move to Appendix A – Adopt as written

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.3 Daylit area of building spaces. In buildings not greater than two stories above grade, not less than 50 percent of the net floor area shall be located within a daylit area. In buildings three or more stories above grade, not less than 25 percent of the net floor area shall be located within a daylit area. Buildings required to have more than 25,000 square feet (2323 m 2 of daylit area shall comply with Section 808.3.2. All other buildings shall comply with either Section 808.3.1 or Section 808.3.2. Exception: For buildings not less than three stories above grade with obstructed exterior walls or shaded roofs, the required daylit area shall be modified in accordance with Equation 8-1. Required daylit area ≥ 25% TDP (Equation 8-1) The total daylight potential (TDP) is a weighted average of the individual daylight potentials for each floor: TDP Σ(DP 1 FA 1 /TF) (DP 2 FA 2 /TF) … For floors with roof area immediately above: DP 1, 2 1 [(OW 1 /TW 1 (OR 1 /TR 1 For floors without roof area immediately above: DP 1, 2 1 (OW 1 /TW 1 OW 1, 2 The length of obstructed exterior wall for each floor that does not face a public way or a yard or court complying with Section 1206 of the International Building

Code or where the distance to any buildings, structures, or geological formations in front of the wall is less than two times the height of the buildings, structures, or geological formations. For the purposes of this determination, the maximum allowed heights of buildings or structures on adjacent property under existing zoning regulations is permitted to be considered. TW 1, 2 The total length of exterior wall for each floor. OR 1, 2 The roof area immediately above each floor that is shaded during the peak sun angle on the summer solstice by permanent features of the building, or by permanent features of adjacent buildings. TR 1, 2 The total roof area immediately above each floor. FA 1, 2 The total floor area of each floor. TF The total building floor area.

PROPOSED ACTION: Move to Appendix A – Adopt as written

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.3.1 Daylight prescriptive requirements. Daylit areas shall comply with Section 808.3.1.1 or 808.3.1.2. For determining the total daylit area, any overlapping daylit areas shall be counted only once. The total daylight area shall be the sum of the area of all sidelighting daylight zones and the area of all toplighting zones, except that sidelighting daylight zones shall not be included in the calculation of the area of toplighting daylight areas.

PROPOSED ACTION: Move to Appendix A – Adopt as written

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.3.1.1 Sidelighting. The daylit area shall be illuminated by fenestration that complies with Table 808.3.1.1 and Figure 808.3.1.1(4). Where fenestration is located in a wall, the daylit area shall extend laterally to the nearest 56-inch-high (1422 mm) partition, or up to 1.0 times the height from the floor to the top of fenestration facing within 45 degrees (0.785 rad) of east or west or up to 1.5 times the height from the floor to the top of all other fenestration, whichever is less, and longitudinally from the edge of the fenestration to the nearest 56-inch-high (1422 mm) partition, or up to 2 feet (610 mm), whichever is less, as indicated in Figure 808.3.1.1(1). Where fenestration is located in a rooftop monitor, the daylit area shall extend laterally to the nearest 56-inch-high (1422 mm) partition, or up to 1.0 times the height from the floor to the bottom of the fenestration, whichever is less, and longitudinally from the edge of the fenestration to the nearest 56-inch-high (1422 mm) partition, or up to 0.25 times the height from the floor to the bottom of the fenestration, whichever is less, as indicated in Figures 808.3.1.1(2) and 808.3.1.1(3). EA (AF VT)/DA (Equation 8-2) where: EA Effective

aperture. AF Area of fenestration. VT Visible transmittance of the fenestration. DA Daylit area.

PROPOSED ACTION: Move to Appendix A using the following language in lieu of written text: The area adjacent to vertical fenestration which receives daylight through the fenestration. For purposes of this definition and unless more detailed analysis is provided, the daylight zone depth is assumed to extend into the space a distance of 15 feet (4572 mm) or to the nearest ceiling height opaque partition, whichever is less. The daylight zone width is assumed to be the width of the window plus 2 feet (610 mm) on each side, or the window width plus the distance to an opaque partition, or the window width plus one-half the distance to adjacent skylight or vertical fenestration, whichever is least.

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects. Language revision matches IECC Chapter 2 – Definitions; suggested to simplify calculations for design and administrative purposes – DPS to consider any other simple standard method as an alternative to proposed language.

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.3.1.2 Toplighting. The daylit area shall be illuminated by a roof fenestration assembly such as a skylight, sloped glazing or tubular daylighting device that complies with Table 808.3.1.1 and Figure 808.3.1.2. The daylit area extends laterally and longitudinally beyond the glazed opening of the roof fenestration assembly to the nearest 56-inch-high (1422 mm) partition, or up to 0.7 times the height from the floor to the bottom of the rough opening of the daylighting well, whichever is less, as indicated in Figure 808.3.1.2.

PROPOSED ACTION: Move to Appendix A using the following language in lieu of written text: The area under skylights whose horizontal dimension, in each direction, is equal to the skylight dimension in that direction plus either the floor-to-ceiling height or the dimension to a ceiling height opaque partition, or one-half the distance to adjacent skylights or vertical fenestration, whichever is least.

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects. Language revision matches IECC Chapter 2 – Definitions; suggested to simplify calculations for design and administrative purposes – DPS to consider any other simple standard method as an alternative to proposed language.

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

808.3.2 Daylight performance requirements. Each daylit area shall comply with the requirements of either Section 808.3.2.1 or 808.3.2.2. Daylight analysis shall be conducted in accordance with Section 808.3.2.3.

808.3.2.1 Morning illumination. Not less than 28 foot-candles (300 lux) and not more than 418 foot-candles (4500 lux) of natural light shall be available at a height of 30 inches (750 mm) above the floor 3 hours before the peak solar angle on the spring equinox. 808.3.2.2 Afternoon illumination. Not less than 28 foot-candles (300 lux) and not more than 418 foot-candles (4500 lux) of natural light shall be available at a height of 30 inches (750 mm) above the floor 3 hours after the peak solar angle on the spring equinox. 808.3.2.3 Daylight analysis. A daylight analysis shall be performed that complies with the following: 1. Sky conditions shall be assumed to be clear. 2. Address the effects of exterior shading devices, buildings, structures, and geological formations on the fenestration of the proposed building and on the ground and other light reflecting surfaces. Include the effects of movable exterior fenestration shading devices. The configuration of fenestration with automatically controlled variable transmittance shall be adjusted to accurately represent the control system operation. 3. Exclude the effects of interior furniture systems, shelving, and stacks. 4. Use the actual reflectance characteristics of all materials. 5. Where blinds, shades and other movable interior fenestration shading devices are included in the analysis and the exact properties of such devices cannot be accurately modeled, such devices shall be assumed to be completely diffusing, with a visible transmittance of 5 percent for fabric shades, and 20 percent for horizontal or vertical blinds. 6. Calculation points shall be spaced not more than 39.4 inches (1 m) by 39.4 inches (1 m). The calculation grid shall start within 20 inches (508 mm) of each wall or partition. 7. Where details about the window framing, mullions, wall thickness and well depth cannot be included in the model, the visible transmittance of all fenestration shall be reduced by 20 percent.

PROPOSED ACTION: Move to Appendix A – Adopt as written RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects 2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1 808.4 Sky types. Sky types as described in Section 808.4.1 or 808.4.2 shall be used in determining the applicable effective aperture in Table 808.3.1.1 808.4.1 United States sky types. All states, counties, and territories shall be sky type B, except as named herein. The states and counties in sky type A shall be: all of Arizona; in Nevada the counties of Churchill, Lincoln, Nye, Washoe, and counties south; in New Mexico the counties of Lincoln, Otero, Sandoval, San Juan, Santa Fe, Torrance and counties south; in Texas the counties of Hudspeth, El Paso, and Jeff Davis; in Utah the counties of Iron, Kane, and Washington; and in California all counties except Del Norte, Siskiyou, Modoc, Humboldt, Trinity, and Mendocino. Alaska shall be sky type C. 808.4.2 International sky types. All international locations shall be sky type B, except as follows: locations with an annual average of more than 75 percent sunshine during daytime hours shall be sky type A, and locations with an annual average of less than 45 percent sunshine during daytime hours shall be sky type C. PROPOSED ACTION: Move to Appendix A – Adopt as written

RATIONALE / IMPACT: Good practice; may be difficult to implement for all projects

2011 ASHRAE 189.1 CORRELATION: 8.3.4, 8.4.1, and 8.5.1

William McNamara
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Chapter 9 - Commissioning, Operation and Maintenance

Chapter 9 – Commissioning, Operation and Maintenance 901.1 Scope. The provisions of this chapter are intended to facilitate the pre- and post-occupancy commissioning, operation and maintenance of buildings constructed in accordance with this code in a manner that is consistent with the intent of other provisions of this code, and to further that goal through the education of building owners and maintenance personnel with regard to related best operating and management practices.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: Chapter 10, 10.1 Scope is comparable

902.1 Approved agency. An approved agency shall provide all of the information necessary for the code official to determine that the agency meets the applicable requirements. The code official shall be permitted to be the approved agency.

PROPOSED ACTION: Replace with IBC definition which is consistent with definition in Chapter 2 of IgCC: [A] APPROVED AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.

RATIONALE / IMPACT: The definition is in conflict with the definition stated in Chapter 2 and therefore creates confusion; and the last sentence implies that the AHJ may take on an unnecessary role

ASHRAE 189.1 CORRELATION: None

902.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: None

902.1.2 Equipment. An approved agency shall have adequate equipment to perform the required commissioning. The equipment shall be periodically calibrated.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: None

902.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and commissioning.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: None

903.1 General. Where application is made for construction as described in this section, the registered design professional in responsible charge or approved agency shall perform commissioning during construction and after occupancy as required by Table 903.1. Where Table 903.1 specifies that commissioning is to be done on a periodic basis, the registered design professional in responsible charge shall provide a schedule of periodic commissioning with the submittal documents that shall be reviewed and approved by the code official. The approved agency shall be qualified and shall demonstrate competence, to the satisfaction of the code official, for the commissioning of the particular type of construction or operation. The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency provided those personnel meet the qualification requirements of this section to the satisfaction of the code official. The approved agency shall provide written documentation to the code official demonstrating competence and relevant experience or training. Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of commissioning activities for projects of similar complexity and material qualities.

PROPOSED ACTION: Adopt as written. Note that ASHRAE 189.1 and LEED 2009 definitions of Commissioning Authority allow building owners to identify personnel for this role and do not specify qualifications or selection criteria: suggest alignment of definitions to eliminate inequity for administration of this process.

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: Chapter 10

903.1.1 Preoccupancy report requirement. The approved agency shall keep records of the commissioning required by Table 903.1. The approved agency shall furnish commissioning reports to the owner and the registered design professional in responsible charge and, upon request, to the code official. Reports shall indicate that work was or was not completed in conformance to approved construction documents.

Discrepancies shall be brought to the immediate attention of the contractor for correction. Where discrepancies are not corrected, they shall be brought to the attention of the owner, code official and to the registered design professional in responsible charge prior to the completion of that phase of the work. Prior to the issuance of a Certificate of Occupancy, a final commissioning report shall be submitted to and accepted by the code official.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: 10.3.1.2.2

903.1.2 Post-occupancy report requirement. Post-occupancy commissioning shall occur as specified in the applicable sections of this code. A post-occupancy commissioning report shall be provided to the owner within 30 months after the Certificate of Occupancy is issued for the project and shall be made available to the code official upon request.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION: 10.3.1.2.3 TABLE

903.1 COMMISSIONING PLAN CONSTRUCTION OR SYSTEM REQUIRING VERIFICATION PREOCCUPANCY POST-OCCUPANCY METHOD OCCURRENCE SECTION / REFERENCED STANDARD Preoccupancy Post-occupancy Chapter 4: Site Development and Land Use Landscape irrigation systems X Field inspection Installation 404.1 Storm water management system operation X X Field inspection Installation Annually Ch 19-13 County Code Site lighting X Testing and report Installation 409

Chapter 6: Energy
Energy consumption monitoring targeting and reporting
a. monitoring system X None Inspection and verification During construction and prior to occupancy None 603,610.5
b. calibration X X Testing and review and evaluation or test reports During commissioning Annually 603,610.5

Mechanical systems completion-all buildings
a. air system balancing-provide the means for system balancing X None Inspection and verification During construction and prior to occupancy None 611.1.2.1 and through reference to IEC C.

b. Hydronic system balancing-provide means for system balancing X None Inspection and verification During construction and prior to occupancy Nine 611.1.2.2 and through reference to IEC C.
c. Mechanical systems manuals-construction documents to require O& M. manual X None Verification of construction documents Prior to use and occupancy permit None 611.1.5.2

Mechanical systems-buildings over 5000 ft.² total building or area
a. Commissioning required and noted in plans and specifications X None Verification of construction documents Plan review 611.1
b. Documentation required commissioning outcomes X None Verification with the building owner Subsequent to completion of all commissioning activities 611.1
c. Preparation and availability of a commissioning plan X None Verification with the RDP or commissioning agent Between plan review and commissioning initiation 611.1.1
d. Balance HVAC systems(both air and hydronic) X X HVAC system installer/contractor or commissioning agent After installation of HVAC systems and prior to occupancy 611.1.2
e. Functional performance testing of HVAC equipment X X HVAC system installer/contractor or commissioning agent After installation of HVAC systems and prior to occupancy 611.1.3
f. Functional performance testing of HVAC controls and control systems X X HVAC system installer/contractor or commissioning agent After installation of HVAC systems and prior to occupancy 611.1.3.2
g. Preparation of preliminary commissioning report X None Commissioning agent None Subsequent to commissioning 611.1.4
h. Acceptance of HVAC systems and equipment/system verification report X None Building owner Nine Letter verifying receipt of the commissioning report 611.1.4.1
i. Preparation and distribution of final HVAC system completion documentation that construction documents require drawings manuals balancing reports and commissioning report be provided to the owner and that they had been provide None X RDP, contractor or commissioning agent None 90 days after final certificate of occupancy 611.1.5

Chapter 6: Lighting Auto demand reduction control system functionality X X Functional testing Final inspection 18 to 24 months 604.4 Specified transformer nameplate deficiency rating X None Field inspection Final inspection None 608.8.11 Verification of lamp X X Field inspection Final inspection 18 to 24 months 608.10 Verification of ballast X. None Field inspection Final inspection None 608.10 Lighting controls
a. Installation X. None Field inspection Post installation None 608.11
b. Calibration X. X. System installer/contractor or commissioning agent Post installation 18 to 24 months 611.3.3

Chapter 7: Water Resource Conservation, Quality and Efficiency Appliances X. None 702.6 Hot water distribution X. None 702.8 Cooling tower performance X. 703.7 .7 Metering X. None 705.1 .1

Chapter 8: Indoor Environmental Quality and Comfort Building construction, feature, operations and maintenance facilitation Air handling system access X. X. Field inspection and verification During construction and prior to occupancy 18 to 24 months 802.2 Air handling system builders X. X. Field inspection and verification During construction and prior to occupancy 18 to 24 months 802.3 HVAC systems Temperature and humidity in occupied space X. Field inspection and verification 18 to 24 months 803.2 Specific indoor air quality and pollution control measures Listing, installation and venting of fireplaces and combustion appliance X. Field inspection and verification During construction and prior to occupancy 804.1

904.1 General. Building operations and maintenance documents in accordance with Section 904.3 shall be submitted to the owner prior to the issuance of the Certificate of Occupancy. Record documents shall be in accordance with Section 904.2. The building owner shall file a letter with the code official certifying the receipt of record documents and building operations and maintenance documents. At least one copy of these materials shall be in the possession of the owner and at least one additional copy shall remain with the building throughout the life of the structure.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good Practice

ASHRAE 189.1 CORRELATION:

904.2 Record documents. The cover sheet of the record documents for the project shall clearly indicate that at least one copy of the materials shall be in the possession of the owner. Record documents shall include all of the following: 1. Copies of the approved construction documents, including plans and specifications. 2. As-built plans and specifications indicating the actual locations of piping, ductwork, valves, controls, equipment, access panels, lighting and other similar components where they are concealed or are installed in locations other than those indicated on the approved construction documents. 3. For sites that have previously been a brownfield, or required environmental corrective action, remediation or restoration at the federal, state or local level, copies of engineering and institutional control information shall be provided. 4. A copy of the Certificate of Occupancy.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good practice

ASHRAE 189.1 CORRELATION:

904.3 Building operations and maintenance documents. The building operations and maintenance documents shall consist of manufacturer's specifications and recommendations, programming procedures and data points, narratives, and other means of illustrating to the owner how the building, site and systems are intended to be maintained and operated. The following information shall be included in the materials, as applicable to the specific project:

1. Directions to the owner or occupant on the manual cover sheet indicating that at least one copy of the materials shall be in the possession of the owner or occupant.

2. Operations and maintenance manuals for equipment, products and systems installed under or related to the provisions of Chapter 4 including, but not limited to, the following, as applicable:
2.1. Vegetative shading, vegetative roofs and natural resource protections and setbacks.
2.2. Water-conserving landscape and irrigation systems.
2.3. Stormwater management systems.
2.4. Permanent erosion control measures.
2.5. Landscape or tree management plans.

3. Operations and maintenance documents for materials, products, assemblies and systems installed under or related to the provisions of this code for material resource conservation in accordance with Chapter 5 including, but not limited to, the following, as applicable:
3.1. Care and maintenance instructions and recommended replacement schedule for flooring, including, but not limited to, carpeting, walk-off mats and tile.
3.2. Care and maintenance instructions for natural materials including, but not limited to, wood, bio-based materials and stone.
3.3. Available manufacturer's instructions on maintenance for:
3.3.1. Exterior wall finishes.
3.3.2. Roof coverings.
3.3.3. Exterior doors, windows and sky-lights.
3.4. Information and recommended schedule for required routine maintenance measures, including, but not limited to, painting and refinishing.

4. Operations and maintenance documents for equipment, products and systems installed under or related to the provisions of this code for energy conservation in accordance with Chapter 6 including, but not limited to, the following:
4.1. Heating, ventilating and air-conditioning systems including:
4.1.1. Recommended equipment maintenance schedule.
4.1.2. Air filters and fluid filters, including recommended replacement schedule and materials.

4.1.3. Time clocks, including settings determined during commissioning.
4.1.4. Programmable controls and thermostats, including settings determined during commissioning.
4.2. Domestic hot water systems including performance criteria and controls.
4.3. Building thermal envelope systems including:
4.3.1. Glazing systems inspection schedule.
4.3.2. Performance criteria for replacements and repairs.
4.3.3. Information and recommended schedule on required routine maintenance measures, including but not limited to, sealants, mortar joints and screens.
4.4. Electrical and lighting systems including:
4.4.1. Technical specifications and operating instructions for installed lighting equipment.
4.4.2. Luminaire maintenance and cleaning plan.
4.4.3. Lamp schedule, recommended relamping plan, and lamp disposal information.
4.4.4. Programmable and automatic controls documentation, including settings determined during commissioning.
4.4.5. Occupant sensor and daylight sensors documentation, including settings determined during commissioning.
4.5. Automatic demand reduction systems.

5. Operations and maintenance documents for equipment, products and systems installed under or related to the provisions of this code for water conservation in accordance with Chapter 7, including, but not limited to the following:
5.1. Domestic fixtures.
5.2. Water-regulating devices including faucets and valves.
5.3. Irrigation and rainwater and gray water catchment.

6. Operations and maintenance documents for equipment products and systems under or related to the provisions of this code for indoor environmental quality in accordance with Chapter 8, including, but not limited to, the following:
6.1. Humidification/dehumidification.
6.2. Green cleaning products, procedures and techniques.
6.3. Recommended window cleaning schedule.
6.4. Ventilation controls. 6.5. Floor finishes.
6.6. Fireplaces and combustion appliances.

PROPOSED ACTION: Adopt as written

RATIONALE / IMPACT: Good Practice A

SHRAE 189.1 CORRELATION: